Research on the Water Environment and Human-Land Interaction in the Wenfeng Pagoda Area of the Lower Reaches of the Yuan River during the Ming and Qing Dynasties

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Abstract: This article takes the Wenfeng Pagoda area in Hanshou County, located in the lower reaches of the Yuan River during the Ming and Qing dynasties, as the research object, and explores the interactive mechanism between water environment evolution and human-land relations, aiming to reveal the impact of historical hydrological changes on regional social and economic development. The study is based on the perspectives of geography, ecology, and environmental science, and integrates climate data, local chronicles, historical population data, and the remains of water conservancy projects to construct a multi-source evidence chain, reconstructing the water environment characteristics and human activity trajectories of the Wenfeng Pagoda area. By analyzing factors such as the climate fluctuations during the "Little Ice Age", population migration, the development of rice agriculture, and the construction of water conservancy facilities, the paper points out that this area experienced significant water environment changes and population restructuring during the Ming and Qing dynasties. The formation of water deity beliefs and water culture spaces also reflects the local society's understanding and governance practices of the water environment. The research results provide empirical support for understanding the historical hydrological patterns and ecological evolution in the middle reaches of the Yangtze River, and also offer historical references for modern river basin management and cultural heritage protection.

Keywords: Wenfeng Pagoda; The Lower Reaches of the Yuan River; The Ming and Qing Dynasties; Water Environment; Human-Land Interaction

1. Introduction

The interactive mechanism between water environment and human-land relationship has become the intersection frontier of environmental history, historical geography, water culture research and ecological governance (Kaushal et al., 2017; Han&Liu,2024). Against the backdrop of increasingly urgent global climate change and regional ecological restoration, the reconstruction of historical hydrological information not only helps to reveal the process of human adaptation and shaping of the water environment, but also provides profound historical support for modern river basin management and cultural heritage protection (Falkenmark,2025; Zuo,2025). China's "strictest water resources management system" and the policy orientation of "determining cities and people based on water resources" have strengthened the coupling logic between water resources and spatial governance (Ministry of Water Resources, 2023). As an important tributary of the Yangtze River, the lower reaches of the Yuan River underwent significant adjustments in hydrological patterns and reconstructions of social Spaces during the Ming and Qing dynasties, becoming an important window for understanding the evolution of regional water culture and the tradition of ecological governance (Wang, 2022; Liu, 2023). The Wenfeng Pagoda area is characterized by low-lying terrain, a dense network of water systems, frequent hydrological events, and the interweaving of water conservancy facilities and cultural nodes, forming a typical complex of water environment and social space. In recent years, the academic community has begun to pay attention to the historical mechanism of the interaction between water cultural sites and the water environment. However, systematic research on the Wenfeng Pagoda area is still relatively scarce, and in-depth discussions are

urgently needed from the perspectives of water environment history, human-land relationship, and cultural geography (Vadjunec et al,2024; Chen, 2022) .However, most of the existing research focuses on water conservancy projects or the cultural sites themselves, and there is still a lack of systematic exploration of the water environment and human-land interaction mechanism in the Wenfeng Pagoda area.

The water environment of the Wenfeng Pagoda area refers to the lower reaches of the Yuan River centered around the Wenfeng Pagoda. Its hydrological features, topographic structure and human activities are closely intertwined, forming a complex space with cultural symbols and ecological functions. This area is located in the southwest of Hanshou County, with a dense water system and a high water surface rate. Historically, it has frequently suffered from floods, which has prompted the local society to constantly adjust water conservancy facilities and settlement layouts (Huaihua City, 2015). Wenfeng Pagoda, as a landmark of water culture, is not only a symbol of the belief in the water god but also plays a significant role in hydrological regulation and spatial governance (Hao, 2005; Li, 2023). During the Ming and Qing dynasties, with the evolution of the migration wave, the garrison system and the local governance system, the water environment in the Wenfeng Pagoda area underwent a transformation from a natural hydrological pattern to a humanistic water conservancy system. This area provides an important empirical basis for studying the water environment changes in the middle reaches of the Yangtze River and the human-land coupling mechanism.

From an academic perspective, this paper fills the gap in the research on the interaction between water environment and human culture in the Wenfengta area of the lower reaches of the Yuan River by constructing a three-dimensional analysis framework of "hydrological pattern - cultural node - social space", promoting the transformation of water environment history research from narrative to spatial and quantitative. The Application of the Theory of Enriching Human-Land Relationship in the Fields of Historical Geography and Cultural Geography (Vadjunec et al.,2024; Zhang,2021). At the practical level, the research results can provide historical support for ecological governance of river basins, protection of cultural heritage and construction of local identity, and facilitate the implementation of the modern water resources management concept of "determining cities and people by water" (Ministry of Water Resources,2023; Siqueira et al,2023) . By restoring the hydrological evolution process and social response mechanism during the Ming and Qing dynasties, this paper provides multi-source evidence and methodological references for the current regional water culture site activation, flood risk assessment and ecological restoration strategies, which has significant practical value and policy significance.

2. Current Situation of Water Environment in Hanshou County

Hanshou County in Changde City, Hunan Province, is located in the monsoon humid zone transitioning from the subtropical to the northern subtropical. The following map shows that the area of Hunan Province belongs to the subtropical evergreen broad-leaved forest region, with an average annual precipitation of 1,415.9 millimeters. The climate is unique and relatively suitable for the ecological environment of crops. However, the period from June to August in summer is characterized by high temperatures, accounting for over 70% of the year's high-temperature periods. This causes high-temperature damage to rice cultivation, which is not conducive to the heading, flowering, and grain-filling and fruiting of rice.

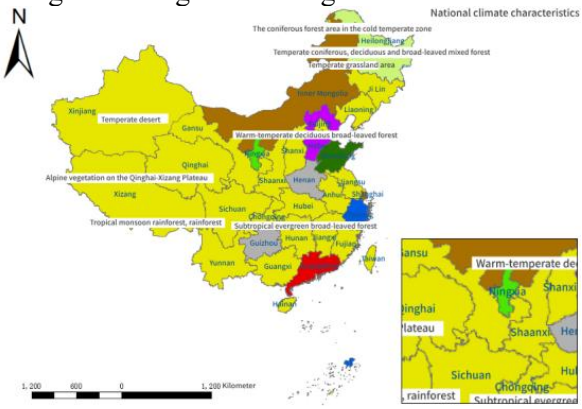

Figure 1. National Climate Characteristics

Wenfeng Pagoda is located in Hanshou County, Changde City, at the lower reaches of the Yuan River. Hanshou County is located on the west shore of Dongting Lake, at the tail end of the Yuan and Li Rivers in the northwest of Hunan Province and the southeast of Changde City. Its geographical coordinates are 111°42 '59 "-112°18" east longitude and 28°36 "-29°6" 45

"north latitude." There are approximately over 30 rivers within the county, covering a water area of 28.49%. Therefore, the water system is relatively developed. The Yuan River and the Lishui River are the two major rivers. The terrain within the county town descends in a stepped pattern from south to north, mainly consisting of plains.

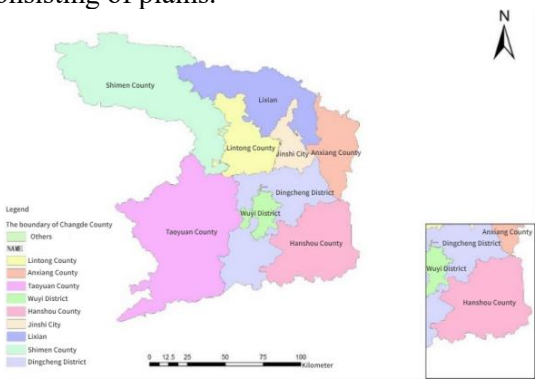

Figure 2. Map of Hanshou County, Changde City

The Wenfeng Pagoda of Hanshou County was built by Ouyang Chao, an instructor (official title) during the Jiajing period of the Ming Dynasty, who piled up earth to construct the Kui Tower at the Zhenlong Pavilion (now the site of Hanshou No.2 Middle School) but failed to complete it. He then moved it to the north of the Nan Chan Temple. In the 31st year of the Wanli reign (1503), Xu Xingke, an instructor (official title), donated funds to rebuild it on the original Kui Tower site as a seven-story, eight-sided, 32.27-meter-high brick and stone structure pagoda, which was named the Wenfeng Pagoda. In the first year of the reign of Emperor Kangxi (1662), Hua Cheng 'en, the assistant commander of the Dongting Naval Corps, and others spent a large amount of money to build the Nan Chan Temple and restore the Wenfeng Pagoda. In the thirteenth year of the reign of Emperor Qianlong (1748), after the Huangmaoling Pagoda was scrapped, Gao Juyuan, a scholar who passed the imperial examination, Fu Guangcong, a county magistrate, Tong Hansheng, Yang Zhifu, Ou Xueyou, Ye Faxiu and others once again advocated the construction of the Nan Chan Temple and carried out high-standard renovations on the Wenfeng Pagoda. Among them, the great benefactor was initiated by Zhou Shixiao, a local, who was the first to produce white gold. As a result, the Nan Chan Temple and Wenfeng Pagoda were once extremely prosperous. Carrying forward the past and ushering in the future, Wenfeng Pagoda, with its even more incredible spiritual energy, protects Longyang and nurtures more elites.

Figure 3. Wenfeng Pagoda in Hanshou County

Here also lived two "Water gods". One was Hui Lie Gong, whose original name was Qing Wensheng. He was from Sichuan Province and served as the official historian of Hanshou County during the Hongwu period of the Ming Dynasty. At that time, there were consecutive years of either floods or droughts, and disasters occurred frequently. He pleaded for the people. Not only did he reduce the taxes on the farmland in his county, but he also submitted several memorials, none of which were approved. Feeling that he had let down the people of Hanshou, he hanged himself under the drum of Dengwen in the imperial palace of Nanjing one day. Zhu Yuanzhang sent people to investigate and the situation stated was true. As a result, he reduced the land tax of Hanshou County by one third, issued an order for a grand burial and erected a shrine in his memory, and conferred the title of Hui Lie Gong. The other one is the

ancient tomb of General Zhang of the former Wu. His original name was Zhang Bo, with the courtesy name Boqi. His father was named Zhang Bing, with the courtesy name Longyangjun. His mother was charitable. As his name is unknown, he is temporarily called Old Lady Zhang. One day, the couple were traveling around Taihu Lake when it happened to be stormy with thunder and rain. The sky turned dark and the old woman suddenly disappeared. In an instant, the clouds parted and the fog cleared, and the sky became clear. The old woman appeared and said to Zhang Bing, "The celestial Maiden bestowed upon her a golden pill to take. Suddenly, she became pregnant." After fourteen months, on the night of the 11th day of the second lunar month in Shenjue (59 BC), at midnight, a son named Zhang Bo was born. When he grew up, he was tall and strong, seven feet tall, with a long nose and a long beard. When the beard fell apart, his hair could hang down to the ground. Later, he was used by the imperial court and entrusted with important tasks, such as diversion of water from rivers and eliminating floods, benefiting the country and the people. His merits were immovable and he was often bestowed by emperors and many temples and shrines were built there. He was worshipped and commemorated on the mountain.

Figure 4. General Zhang's Tomb

3. The Relationship between People and Land in Wenfeng Pagoda, Hanshou County during the Ming and Qing Dynasties

The issue of the relationship between humans and the earth is a comprehensive and interdisciplinary one. "Many disciplines explore different aspects of the relationship between humans and the earth from different disciplinary backgrounds, different levels and scales". In this article, the author mainly explores the natural and human geographical features of the Wenfeng Pagoda in the lower reaches of the Yuan River during the Ming and Qing Dynasties from the perspectives of natural sciences such as geography, ecology, climatology and environmental science.

Figure 5. Huilei Cemetery

3.1 Climate and Environmental Changes in Hanshou County during the Ming and Qing Dynasties

In the course of historical development, it has to be admitted that the chain reaction or feedback mechanism of climate - ecology - economy - society has a significant impact on social and historical development. The Little Ice Age generally refers to the period from 1450 to 1890 when the global climate was relatively cold, with temperatures 1-2℃ lower than those of modern times. This period in China coincided with the Ming and Qing dynasties, and thus it is also known as the "Little Ice Age of the Ming and Qing Dynasties". As Table 1 shows, the development of human civilization mainly occurred during the post-glacial period after the retreat of glaciers on continents such as Eurasia. In China, the past 5,000 years (i.e., the second half of the post-glacial period) can be divided into four warm and cold periods. The fourth cold period occurred during the Ming and Qing dynasties. However, this period was not entirely cold; there were also several relatively small fluctuations in temperature.

Table 1. The Changes in Temperature Since the Ming and Qing Dynasties

Cold period	Warm period
The first time: 1470-1520 (the sixth year of the Chenghua reign to the fifteenth year of the Zhengde reign of the Ming Dynasty)	The first time: 1560-1660 (the 29th year of the Jiajing reign of the Ming Dynasty to the 28th year of the Wanli reign)

The second time: 1620-1720 (from the first year of the Changtai reign of the Ming Dynasty to the 59th year of the Kangxi reign of the Qing Dynasty	The second time: 1720-1830 (from the 59th year of the Kangxi reign to the 10th year of the Daoguang reign of the Qing Dynasty)
The third time: 1840-1890 (from the 20th year of the Daoguang reign to the 16th year of the Guangxu reign of the Qing Dynasty)	The third time: 1916 -1945
The fourth time: After 1945 (especially after 1963)	

So, what is the climate situation like in the middle and lower reaches of the Yangtze River at this time? The topography of this area is mainly plain. Due to the lack of high mountains as a barrier in the north and the many hills in the south, except for the Dabie Mountains which have a slight barrier effect, the rest of the area is low, fragmented and incoherent. Therefore, the terrain has little impact on the climate. Whenever cold air moves southward, it is affected from north to south, and the consistency of temperature changes is good.

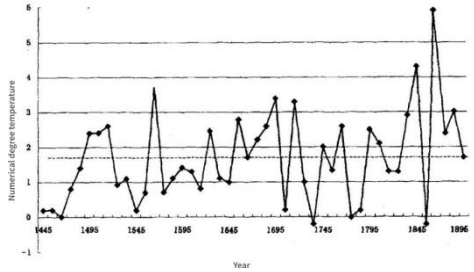

Figure 6. Temperature Index Sequence Map of the Middle and Lower Reaches of the Yangtze River from 1440 to 1899

The drastic fluctuations in climate and frequent natural disasters during the Ming and Qing dynasties directly affected the output of rice agriculture and, in turn, had a significant impact on social development. At the end of the Ming Dynasty, the north suffered from low temperatures and frequent snow and frost disasters, which seriously affected the production and life of the Jurchen people, who mainly engaged in nomadic herding. Livestock died and food was in short supply, accelerating the pace of the Jurchen people's southward migration into the pass. During the severe drought of Chongzhen, agricultural harvests were poor, famines broke out frequently, and peasant uprisings continued, leading to the fall of the Ming Dynasty... In the early Ming Dynasty, hundreds of thousands of immigrants flowed into the Yuan River Basin to cultivate the river valleys. Due to the relatively flat and wide terrain of Changde Prefecture in the lower reaches of the Yuan River and its crisscrossing waterways, the area of cultivated land expanded rapidly. A resident of Wuling County, Changde Prefecture, suggested to the government: In the ten counties including Wuling, since the rise of the army in the Year of Bing Shen, the people have scattered. Although it may resume business, the land is vast and sparsely populated, with few people engaged in farming and many left uncultivated. In the neighboring counties of Jiangxi Prefecture, there are many people without land and unemployed. Pardon Jiangxi Province and lead the poor to start farming. All farmers should do their best to benefit the land. It was also because of this suggestion that the Ministry of Revenue sent people to Jiangxi, allocating more than Ding households and the unemployed to cultivate and plant there, which led to a considerable development of agriculture in Changde Prefecture.

3.2 Population Changes at Wenfeng Pagoda in Hanshou County during the Ming and Qing Dynasties

(1) During the Ming Dynasty, the population of Hanshou County grew rapidly.As Table 2 shows, especially in the early Ming Dynasty, the Yuan River Basin absorbed a large number of immigrants from outside, thus providing sufficient labor force for economic growth. However, the population gradually slowed down in the middle of the Ming Dynasty. There are mainly two factors regarding population migration here:

Table 2. The Changes in the Registered Household Registration of Changde Prefecture in the Lower Reaches of the Yuan River during the Ming Dynasty

Prefectures and states	State and county	The number of households in the eighth year of the Chenghua reign	The number of households in the seventh year of the Zhengde reign	The number of household registrations during the Wanli period
Changde Prefecture	Wuling County	7028 29153	7549 47711	9336 53671
	Taoyuan County	4138 27418	4168 27434	5377 44664

	Longyang County	4805 19160	4859 33497	5411 37839
	Yuanjiang County	825 4071	968 7146	1021 8370

On the one hand, during the Ming Dynasty, military garrisons were widely established, and a large number of military immigrants entered the Yuan River Basin.

There are two reasons: First, the area along the Yuan River is a region where ethnic minorities and Han people live together. To maintain local stability, a large number of troops need to be stationed there. Secondly, in order to strengthen the control over the transportation line between Hunan and Guizhou, and for the large-scale development of Hubei and Hunan as well as Yunnan and Guizhou, the Ming government also needed to establish many military garrisons here. The Yuan River Basin was the most important passage connecting Hubei and Hunan with Yunnan and Guizhou regions, and this was also the main reason for the migration in the Yuan River Basin.

On the other hand, the Ming government's development and operation of the Yunnan and Guizhou regions led to a large number of Han people going to work, do business or cultivate and clear land in Yunnan and Guizhou. Many of them settled in the Yuan River Basin along the way.

This is manifested in two aspects: First, apart from the military troops stationed there, there are also many local immigrants who have moved to the Yuan River Basin. In September of the 28th year of the Hongwu reign, the Ming government ordered the Five Guards of Jingzhou and the new troops of Chen and Yuan to select 45,000 elite troops and move them to Yunnan. In October, the people of Changde and Chenzhou prefectures were transferred again. Among those with more than three ding, one ding was dispatched and stationed in Yunnan. For instance, in the eighth year of Yongle, over 500 families of surnames such as Chai, Xiong, Hu, CAI and Xiang from Chenxi County, Yang, Zheng, Peng, Lin and Fan from Yuanling County, and Zhang, Tian, Yan, Luo, Tang and Li from Youyang, Sichuan Province, moved to the Yinjiang area of Guizhou Province to settle down. Many people moved to the Tujia ethnic area from Changde and Chenzhou regions and often had disputes with the indigenous people. The second key transportation route connecting the middle reaches of the Yangtze River with the Yunnan-Guizhou region is to travel along the Yuan River from Changde towards the middle and upper reaches, reaching Guizhou and Yunnan. Under the impetus of the Ming government's development of Yunnan and Guizhou, many emigrants would also stay here and cultivate the land. Moreover, a large number of merchants would be active in the ports along the Yuan River, engaging in trade activities. As a result, products and culture would be continuously exported and imported, driving economic development. The lower reaches of the Yuan River, Changde, "was the water and land transportation hub of the capital and the province, and the only way to enter Yunnan". As the commercial center of the basin, by the middle of the Ming Dynasty, it had become a place where people gathered from all directions, and those who were extravagant and extravagant were disregarding their excessive propriety.

(2) During the Qing Dynasty, not only did the population in the Yuan River Basin increase significantly, but the mobility was also quite frequent, and the scale of corresponding economic development was the largest. As Table 3 shows, the relocation of people from Jiangxi to Hubei and Hunan was one of the major migration activities in Chinese history. It lasted through the Yuan, Ming and Qing dynasties and formed the main body of the population in the Hubei and Hunan regions during the Ming and Qing periods. It achieved the economic status of "when Hubei and Hunan are prosperous, the whole country has enough" and initiated the glorious era of "Only the talents of Chu are most abundant here".

Table 3 The changes in the population of the Yuan River Basin in Hunan Province during the Early Qing Dynasty

Name of the prefecture	Changde Prefecture	Chenzhou Prefecture	Yuanzhou Prefecture	Yongshun Prefecture	Jingzhou
The original number of personnel	36099	14104	The total number of original and multiplying amounts to 256,379	31469	13803
Breed a population	696404	447118		170103	315902

There were three specific reasons for the rapid increase in population during the Qing Dynasty:

One was the policy of recruiting people to reclaim land after the reign of Emperor Kangxi of the Qing Dynasty, which attracted a large number of immigrants to move into the Yuan River Basin. Due to the large-scale wars that took place in Hunan as the main battlefield during the late Ming and early Qing dynasties, the Yuan River Basin suffered severe damage, leading to economic decline and a sharp decline in population. For instance, during the reign of Emperor Kangxi, Xupu County said, "When I first entered the territory, all I could see was the remaining lush grass, and there was very little smoke in the village." "All the houses were in ruins, and half of the men and women were dead. Those who were severely affected by the epidemic and could not bear it, and were inevitably hungry, fled far away." To restore the economy, the Qing government began to vigorously implement the policy of immigration and land reclamation from the middle of the Qing Dynasty. After two hundred years of cultivation, by the Daoguang period, it was already "full of land and people".

The second was the policy of replacing native chieftains with streams that began during the Yongzheng period, which attracted a large number of immigrants to settle in the ethnic minority areas of western Hunan. During the reigns of Emperor Shunzhi and Emperor Kangxi in the early Qing Dynasty, the old systems of the Yuan and Ming dynasties were still in use, and the Tusi system was implemented in the areas where the Tujia and Miao ethnic groups lived in compact communities in western Hunan. However, starting from the fourth year of the Yongzheng reign, the Qing government carried out large-scale reforms in Yunnan, Guangxi, Sichuan, Huguang and other places, establishing the central government's administrative control over local areas, setting up prefectures and counties, and replacing them with the flow management system for governance. This also sparked a large wave of people immigrating to the Xiangxi region. The migrant population could freely cultivate and farm, and the government also adopted various preferential measures to attract people to cultivate.

Thirdly, the Qing government's "recruitment of the Miao people" and "Miao prevention" measures brought a large number of immigrants to the "Miao territory" in the Yuan River Basin and its surrounding areas. Xiangxi and Qiandongnan are the largest settlements of the Miao people in China. After the reform of the local chieftain system, the Qing government directly dispatched exiled officials to govern them. However, a large number of Han officials, soldiers and "Hakka people" entered the Miao region along with the exiled officials. Many of them exploited and defrauded the Miao people at will, which aroused fierce resistance from the Miao people. After the Miao people's uprising was suppressed during the Qianlong period, the Qing government strengthened the suppression of the Miao region and also increased the number of troops stationed there. This series of measures has been quite effective. By the thirteenth year of the Jiaqing reign, "Fu Nai, the military Commissioner of Chenyuan Yongjing, had been in charge of the Miao region for over ten years. He weeded the weeds and pacify the good, eliminated the ills and promoted the benefits. He built over a thousand fortresses, cultivated over 120,000 mu of farmland, provided relief to over 100,000 displaced households, and trained 8,000 troops."

4. Conclusion

This study adopted a multi-source data integration method to restore the hydrological pattern of the lower reaches of the Yuan River during the Ming and Qing Dynasties through spatial information technology. Combined with historical GIS technology, a database of water environment evolution in the Wenfeng Pagoda area from 1644 to 1911 was constructed. The coupling relationship between the distribution of water conservancy facilities and the frequency of disasters was analyzed by using the niche Model (ENM), and the dissemination path of the water god belief system was revealed by means of the social network analysis method. Cross-verify 12 local Chronicles such as the "Changde Prefecture Annals of Jiajing" and the "Longyang County Annals of Jiaqing" with climate archives such as the "Qinggong Qingyu Lu" and the "Annual Inspection of the Yangtze River Hydrology", and establish a hydrological time series with a time resolution of 10 years.

First, during the Ming and Qing dynasties, the evolution of the water environment in the lower reaches of the Yuan River presented the characteristics of coexistence of natural drive and human regulation. Climate fluctuations, migration waves and water conservancy

construction jointly shaped the regional hydrological pattern.

Second, the Wenfeng Pagoda area forms a typical complex of water culture and social space. The belief in water gods and water conservancy facilities jointly participate in the spatial governance and cultural identity construction of the local society.

Thirdly, the relationship between humans and the land demonstrates a highly coupled dynamic mechanism. Local societies constantly reshape their understanding and governance logic of the water environment through cultural practices and technological means.

This article is related to "Water Culture landscape" （ Strang,2020;Von Schonfeld et al.,2025）、"Environmental Memory"（Jones & Cloke,2022; Hein,2022)And "social-nature hybrid" （Swyngedouw,2019; Schulz & Gros, 2024)emphasizing that the water environment is not only a part of the ecosystem but also a carrier of cultural memory and local identity. The case of the Wenfeng Pagoda area shows that local society continuously reshapes the perception of water environment through cultural mechanisms and spatial practices, forming a resilient governance system. This process also reveals the potential value of historical hydrological information in modern ecological governance（Linton,2021; Siqueira et al.,2023).

Compared with existing studies, the contributions of this article lie in the following: First, it proposes a three-dimensional framework of "hydrological pattern - cultural node - social space", enriching the application of the human-land relationship theory in the history of water environment; Second, a multi-source evidence chain should be constructed, integrating local Chronicles, climate data and spatial information to enhance the accuracy and reproducibility of historical hydrological research. Third, it provides historical references for the ecological governance of river basins, the protection of cultural heritage and the construction of local identity, and helps the implementation of the policies of "determining cities and people based on water".

The implications of the research lie in: First, introducing remote sensing and GIS technologies to enhance the spatial accuracy of historical hydrological reconstruction; Second, deepen the research on the interactive mechanism between water culture and local identity, and expand the dimension of cultural geography; Third, conduct cross-regional comparative studies to construct the typology and evolutionary paths of Chinese water culture sites; Fourth, explore the application of digital humanistic methods in the revitalization of water cultural heritage and promote the transformation of academic achievements into social practice.

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